

## REMARKS/ARGUMENTS

This response is intended to be a complete response to the office action of January 26, 2005 and the case is believed to be in condition for allowance. Accordingly, reconsideration is respectfully requested.

Claims 2-9, 12-17, 20-26 and 28-36 are pending in the application. Claims 2-9, 12-17, 20-26, and 28-35 were rejected in the office action. Claims 8 and 23 are amended herein. New Claim 36 is presented herein.

### 35 USC 112, 2<sup>nd</sup> paragraph

Claim 23 was rejected under 35 USC 112, second paragraph, as lacking antecedent basis for the limitation “wherein at least one of the steps of transmitting a signal of known power, measuring the signal amplitude, comparing the power level received, transmitting an indication to adjust the power level, and adjusting the power level of at least one of the carriers is executed concurrently with the step of acquiring well-log data.” Claim 23 has been amended to correctly refer back to antecedents found in its base claim. Accordingly, applicants respectfully request reconsideration of Claim 23 and its early allowance.

35 USC 103(a)

Matsumoto

Claims 21, 22, 24, 25, 28, 29, 31, and 32 were rejected under 35 USC 103(a) as unpatentable over Matsumoto (U.S. Patent Number 6,522,731). Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness. "To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP 2143. The Examiner has failed to meet this burden.

Let's consider these three criteria one-by-one: "First, there must be some suggestion or motivation ... to modify *the reference*." Claim 21 recites "a method of operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable, comprising: transmitting a known signal on each of a plurality of carriers from the downhole telemetry cartridge to the uphole telemetry unit". As the Examiner has observed, "Matsumoto does not disclose the method is implemented in a well-logging system wherein the first and second telemetry cartridges are uphole and downhole telemetry units" (Office Action, Page 4, lines 12-13). Thus, with respect to the first criteria set forth in the MPEP

Section 2143, the issue is whether there is some suggestion or motivation to modify Matsumoto to include the downhole telemetry cartridge and the uphole telemetry unit and, to achieve a method for operating a well-logging telemetry system, other elements necessary for well-logging telemetry. That motivation may come from the reference itself or knowledge generally available to one of ordinary skill in the art. MPEP 2143. Matsumoto deals with solving problems that one may encounter in the telephony art. In particular, Matsumoto deals with problems that are associated with using a telephone line simultaneously for data communication and audio communication. Therefore, considering that Matsumoto deals with problems found in exclusively in telephony, it is not surprising that there is no suggestion in Matsumoto to apply the methods taught therein to the operation of a well-logging telemetry system.

The second alternative source for the motivation to modify (knowledge generally available to one of ordinary skill in the art) also leads to a conclusion that there is no motivation to modify Matsumoto as suggested by the Examiner. “The Examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claim” (in re Rouffert). The set of “same problems as the inventor and with no knowledge of the claimed invention” inherently does not include the use of DMT modulation in well-logging applications, as there is no reference of that kind system in the prior art. Therefore, the “same problems as the inventor” would by implication be prior art well-logging telemetry systems of the kind that existed at the time of the

invention. Considering that such systems did not use multiple carrier frequencies, a person faced with dealing with prior well-logging telemetry systems would not be motivated to modify such prior art systems to include any of the four elements from Claim 21: “transmitting a known signal on each of a plurality of carriers from the downhole telemetry cartridge to the uphole telemetry unit; measuring at the uphole telemetry unit the signal-to-noise ratio on the known signal on each of the plurality of carriers; using the signal-to-noise ratio measurement to determine the number of bits-per-constellation to use for each carrier; and populating a bits-per-carrier table with the bits-per-constellation value for each carrier.” Accordingly, there is no motivation or suggestion to modify Matsumoto found in the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art.

“If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” MPEP 2143.01 *quoting* In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The Matsumoto invention deals with the problems associated with using a telephone line simultaneously for audio communication and data communication (“the data communication service is unavoidably affected by the telephone service using the audio band” (Matsumoto, Col. 2, lines 3-4); “As described above, the data communication apparatus according to this invention is suitable for the data communication xDSL scheme using the telephone line for audio band communication” (Matsumoto, Col. 13, lines 26-30)). Adding the necessary equipment to Matsumoto to provide for a down-hole telemetry

cartridge and to receive well-logging data would necessarily be considered “unsatisfactory” for most any person finding himself using the Matsumoto invention for telephony from the downhole location. Accordingly, there would be no suggestion or motivation to make the proposed modification.

“If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious” MPEP 2143, *quoting*, *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). The required modification to Matsumoto to add a downhole telemetry cartridge and to otherwise place Matsumoto in the environment of well-logging operations would inherently change the principle of operation of Matsumoto considering that Matsumoto explicitly deals with telephony systems. Accordingly, for this reason also, a *prima facie* case of obviousness has not been established.

Addressing now the Examiner’s argument from the Office Action: the Examiner makes the erroneous assertion that “it would have been obvious to one of ordinary skill in the art at the time the invention was made that since it is well known that DMT modulation can be used in the presence of cables, the method of Matsumoto could have been implemented in a well-logging environment.” “To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed

invention or the examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.” MPEP 2142 *quoting* Ex parte Clapp, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). The Examiner has offered no reference that expressly or impliedly suggests that DMT modulation may be used in a well-logging environment.

Thus, in the absence of suggestion for the modification in the references themselves, one would have to look to whether the examiner has presented a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious. The Examiner’s argument merely is that “since it is well known that DMT modulation can be used in the presence of cables, the method of Matsumoto could have been implemented in well-logging environment.” Applicants respectfully point out that even if a technique can be used in one scenario, it does not follow that it can be used in all other scenarios within the same class. The obviousness of using a technique in one subclass when it is used in another subclass cannot be based solely on the two classes belonging to a greater common class. If the contrary rule was true, hardly any invention would be patentable. Thus, the Examiner’s assertion that DMT modulation can be used in the presence of cables cannot be deemed sufficient to provide a convincing line of reasoning to arrive at the conclusion that Matsumoto could have been implemented in a well-logging environment in the absence of a suggestion to modify Matsumoto’s teaching for use in a well-logging application.

Accordingly, for any of the foregoing reasons the Examiner has failed to meet the first criteria for establishing a *prima facie* case for the assertion that Claims 21, etc. are obvious over Matsumoto.

Second, there must be a reasonable expectation of success. MPEP 2143. The proposed modification to Matsumoto could not reasonably be expected to succeed. Matsumoto teaches certain techniques associated with DMT modulation as used in an xDSL system notably to solve the problems associated with the simultaneous use of a telephone line to transmit audio and DSL-transmitted data. Thus, to arrive at Applicants' invention would require the addition of elements and aspects associated with well-logging operations. Therefore, the issue is whether it would be reasonable to expect to succeed in using DMT modulation in a well-logging environment ("operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable, comprising: transmitting a known signal on each of a plurality of carriers from the downhole telemetry cartridge to the uphole telemetry unit" (Claim 21)). A well-logging telemetry system inherently deals with very different conditions from a telephony system: e.g., harsher conditions, higher temperatures, cables designed for different purposes (mechanical qualities, higher pressures, longer cable lengths). These conditions all factor on whether it would be reasonable to expect to succeed. DSL equipment available at the time of invention imposed operating restrictions that would not meet the requirements of down-hole operations. For example, cable lengths under DSL systems are not to exceed 18,000 feet (as opposed to 30,000 feet typically required by well-logging operations). Furthermore, at the time of the invention, Applicants' could not find any

DSL vendor with equipment that could operate at the temperatures found in oil-wells. Therefore, it would not be reasonable to expect to succeed in applying Matsumoto to well-logging operations.

Finally, the prior art references must teach or suggest all the limitations of the claimed invention. As the Examiner has noted “Matsumoto does not disclose the method is implemented in a well-logging system wherein the first and second telemetry cartridges are uphole and downhole telemetry units” (Office Action, Page 4, lines 12-13). The Examiner erroneously relies on a statement that “it would have been obvious to one of ordinary skill in the art at the time the invention was made that since it is well known that DMT modulation can be used in the presence of cables, the method of Matsumoto could have been implemented in a well-logging environment” (Office Action, Page 4, lines 17-20). However, as argued above (that argument incorporated here by reference) that conclusion by the Examiner is based on flawed logic (namely, that because DMT can be used with cables and well-logging operations use cables, therefore it would be obvious to use the techniques of Matsumoto in well-logging) and has not been supported by any evidence. Accordingly, the third criteria for a *prima facie* case of obviousness has not been met.

To establish a *prima facie* case of obviousness, three basic criteria must be met: motivation to combine, expectation of success, teaching of all elements. The Examiner has failed to meet each of these criteria. Accordingly, because a *prima facie* case of obviousness has not been met if even just one of the three criteria have not been satisfied, the Examiner has failed to establish a *prima facie* case of

obviousness for the proposition that Claim 21 is obvious over Matsumoto. Therefore, Applicants respectfully request allowance of Claim 21.

Claims 28 and 29 recite analogous limitations to Claim 21, e.g., “operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable ... transmitting the modulated bit stream on a first propagation mode from the downhole telemetry cartridge to the uphole telemetry unit” (Claim 28) and “A method of operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable ... transmitting the modulated bit stream on a first propagation mode from the downhole telemetry cartridge to the uphole telemetry unit” (Claim 29) and are patentable for all the reasons provided above in support of Claim 21.

Claims 22, 24, 25, 31, and 32, depend from Claim 21 or Claim 29, incorporate all the limitations of their respective base claims, provide further unique combinations, and are patentable for the reasons given in support of the base claims and by virtue of such unique combinations.

“If examination at the initial stage does not produce a prima facie case of unpatentability, then without more the applicant is entitled to grant of the patent.” In *re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992), *quoted in* *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994). Thus, for the reasons given above, Applicants respectfully request withdrawal of the rejection of Claims 21, 22, 24, 25, 28, 29, 31, and 32 and their early allowance.

Bae

Claim 26 was rejected under 35 USC 103(a) as unpatentable over Bae et al. (U.S. Patent No. 5,832,387, hereinafter Bae). Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness. As a reference with respect to Claim 26, Bae is very similar to Matsumoto as a reference with respect to Claims 21, 28, and 29, argued herein above. The argument in support of Claim 21 is incorporated herein by reference as applied to Bae with respect to Claim 26.

Bae fails to teach or suggest “A method of operating a well-logging telemetry system having a downhole telemetry cartridge and an uphole telemetry unit connected by a wireline cable ... transmitting a signal of known power level on each of a plurality of carriers from the downhole telemetry cartridge to the uphole telemetry unit” (Claim 26). The Examiner has acknowledged that “Bae et al. does not disclose the method is implemented in a well-logging system wherein the first and second devices are uphole and downhole telemetry units (Office Action, Page 9, lines 10-11). Again, the Examiner merely offers “it would have been obvious to one of ordinary skill in the art at the time the invention was made that since it is well known that multicarrier modulation can be used in the presence of cables, the method of Bae et al. (sic) could have been implemented in a well-logging environment.” As with Matsumoto, this assertion is unfounded in the evidence presented by the prior art and is arrived at with the same faulty logic as applied by the Examiner with respect to Matsumoto. From the premise that a technique can be used in the presence of cables it does not follow that the same technique can be used in all uses of cables. The

Examiner has failed to meet the burden of providing “a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious”.

However, because of the conclusion (albeit faulty as it is) that “it would have been obvious to one of ordinary skill in the art ... that Bae could have been used in a well-logging environment”, the Examiner has not addressed the issue of whether a person working in the art of well-logging telemetry would have been motivated to modify such telemetry systems by adopting the teachings of Bae. The answer to that inquiry would be that that person would not be so motivated. Prior art well-logging telemetry systems did not use multi-carrier modulation. Bae teaches a technique that is used in multi-carrier modulation. Therefore, because a person working in the field of well-logging telemetry would not have been working with multi-carrier modulation, that person would not have been motivated to adopt the Bae methods to the prior art well-logging telemetry systems.

Second, there must be a reasonable expectation of success. MPEP 2143. The exact same argument as that stated above with respect to Matsumoto applies here and is incorporated here by reference. In conclusion, for the reasons given there (e.g., length of cable, harsh conditions, depth of equipment meeting operating requirements), there would not be a reasonable expectation to succeed in adopting the teachings of Bae in a well-logging environment.

Finally, the prior art must teach or suggest all the limitations of the claimed invention. As the Examiner has noted that Bae lacks the well-logging elements of the claimed invention and had to rely on the faulty argument that the use of DMT in well-logging would have been obvious from the knowledge that DMT may be used in the

presence of cables. Because of the failure of that argument, it cannot be used to negate the fact that all limitations of Claim 26 have not been taught by Bae.

From the foregoing argument it is clear that the Examiner has failed to meet the burden of presenting a case that Claim 26 is *prima facie* obvious over Bae. Accordingly, Applicants respectfully request withdrawal of the rejection and allowance of Claim 26.

New Claim 36 depends from Claim 26, incorporates all the limitations of Claim 26, and adds the further limitations of “determining whether an increase in power level would improve the bits-per-carrier for the each carrier and whether a decrease in power level would degrade the bits-per-carrier for the each carrier” and using that determination to “[indicate] to increase the power level if an improvement in number of bits-per-carrier may be achieved by a permissible increase in power” and to “[indicate] to lower the power level if there would be no degradation in the number of bits-per-carrier by lowering the power level.” Bae fails to teach or suggest the additional limitations recited by Claim 36. Accordingly, Claim 36 is patentable over Bae for the reasons given in support of Claim 26 and by virtue of such further limitations. Accordingly, Applicants respectfully requests allowance of Claim 36.

Gardner in view of Isaksson

Claims 8, 12, 13, 20, and 30 were rejected under 35 USC 103(a) as unpatentable over Gardner et al. (U.S. Patent Number 5,365,229, hereinafter Gardner)

in view of Isaksson et al. (U.S. Patent Number 6,493,395, hereinafter Isaksson). Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness.

Claim 8 has been amended to more clearly recite the subject matter of the invention and recites “a downhole telemetry cartridge connected to the at least one downhole tool ... a transmitter ... operable to cause transmission of the bitstream as analog signals on a plurality of carrier frequencies to an uphole telemetry unit connected to the downhole telemetry cartridge by a wireline ... a cable driver having transmission power level control circuitry having logic to control the transmission power to optimize the total transmission power applied to the wireline cable as a function of a received adjustment signal which transmitted to the downhole telemetry cartridge from the uphole telemetry unit” and Claim 12 recites analogous limitations.

Again, with respect to the rejection of Claims 8 and 12, the Examiner has failed to meet the three criteria for establishing a *prima facie* case of obviousness.

First, suggestion or motivation to combine the references. "There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." MPEP 2143.01 *quoting* In re Rouffet, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998). Both Gardner and Isaksson lack any suggestion to combine the teaching of the one with teaching of the other. Furthermore, the Examiner has not presented a convincing line of reasoning as to why the claimed invention would have been obvious in light of these references. The

Examiner's reasoning for combining Gardner and Isaksson is limited to the statement that "it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the transmitter and receiver of Gardener (sic) with the transmitter and receiver logic of Isaksson et al. because DMT modulation divides the frequency band into discrete subchannels, which allows transmitter to avoid the noisy channels and maximize the bit rate using the best subchannels. DMT modulation also reduced crosstalk between channels which allows for transmission at higher bit rates." (Office Action, Page 11, lines 11-17). This is also flawed logic. From the premise that DMT modulation divides the frequency band into subchannels allowing avoidance of noisy channels and maximization of bit rate, it does not follow that it would be obvious to modify Gardner to use such a modulation technique.

Reasonable expectation to succeed. As described in the Specification: "[a] modern oil well may be drilled to a depth of in excess of 30,000 feet." Specification, Page 2, lines 3-4. Gardner describes his system in the context of 30,000 foot and 26,000 foot cables (Gardner, Col 6, lines 25, 36, 58). Isaksson, on the other hand, states their system operates on copper cables of less than <1300 meters (~4,200 feet) (Isaksson, Col. 6, lines 25-29, Col. 6, lines 34-35, and Col. 7, line 24). Therefore, considering that Isaksson could not meet one fundamental design criteria for well-logging telemetry (cable length), a person studying Isaksson and wishing to make improvements to well-logging telemetry systems such as that taught by Gardner would not have expected to have success from making the suggested combination. Furthermore, as Gardner observes, oil well operations require operating temperatures of up to 250 degrees C. At the time of the invention no manufacturer known to

Applicants provided DMT equipment that could operate at such temperatures. Therefore, the expectation would have been failure rather than success.

All Claim Limitations Must be Taught or Suggested. Claim 8 recites “logic to control the transmission power to optimize the total transmission power applied to the wireline cable as a function of a received adjustment signal which transmitted to the downhole telemetry cartridge from the uphole telemetry unit and ... and logic to measure the received signal amplitude and to transmit the received adjustment signal to the downhole telemetry cartridge.” In arguing that Claim 12 (which includes analogous limitations to those added to Claim 8 herein) is obvious the Examiner made the observation that “Gardner and Isaksson [do not disclose] the receiver comprising logic operable to cause transmission from the receiver to cable driver of a control signal indicative to the transmission power level control circuitry to increase or decrease the total transmission power applied to the wireline cable or for a carrier frequency.” (Office Action, Page 11, Lines 18-22). The Examiner has not offered any evidence or reasoning to support the notion that such an improvement would have been obvious to one of ordinary skill in the art.

For the foregoing reasons, the Examiner has failed to establish a prima facie case for obviousness of Claims 8 and 12 over Gardner in view of Isaksson. Accordingly, Applicants respectfully requests withdrawal of the rejection and allowance of the claims. Claims 13, 20, and 30 depend from either claim 8 or 12, recite further unique and non-obvious combinations and are patentable for the reasons given in support of their respective base claims and by virtue of such further combinations and should therefore also be allowed.

Gardner in view of Matsumoto

Claims 14, 15, and 33-35 were rejected under 35 USC 103(a) over Gardner in view of Matsumoto. Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness.

The proffered combination of Gardner and Matsumoto is again a suggestion to combine Gardner with a reference that teaches a technique relating to DMT. Applicants reiterate the arguments made above with respect to the Gardner and Isaksson. A person of ordinary skill in the art would not be motivated to combine the Gardner and Matsumoto references for the same reasons as given above with respect to the proffered combination of Gardner and Isaksson. There is no suggestion to combine the references found in either Gardner or Matsumoto. The Examiner has not offered a convincing line of reasoning as to why the artisan would have found the claimed invention obvious, and the expectation of success is not present (as with Isaksson, Matsumoto is limited in range and operating conditions).

Accordingly, there is no suggestion to combine Gardner and Matsumoto. Thus, the Examiner has failed to establish a *prima facie* case of obviousness of Claims 14, 15, 33-35 over Gardner in view of Matsumoto. Applicants respectfully requests withdrawal of the rejection and allowance of the claims.

Gardner in view Isaksson in further view of Baird

Claims 2-7 and 9 were rejected under 35 USC 103(a) as unpatentable over Gardner in view of Isaksson in further view of Baird (U.S. Patent Number 6,469,636). Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness. The argument set forth above that there is no suggestion motivation to combine Gardner and Isaksson to produce the claimed invention is incorporated here by reference. Baird provides no teaching or suggestion that would provide the suggestion to combine Gardner and Isaksson. Therefore, the failure to provide a motivation or suggestion to combine the Gardner and Isaksson references also applies to the rejection of Claims 2-7 and 9. Accordingly, applicants respectfully requests withdrawal of the rejection and allowance of the claims.

Gardner in view of Matsumoto and in further view of Tzannes

Claims 16 and 17 were rejected under 35 USC 103(a) as unpatentable over Gardner in view of Matsumoto and further in view of Tzannes (U.S. Patent Number 6,798,735, hereinafter Tzannes). Applicants respectfully traverse.

The Examiner has failed to establish a *prima facie* case of obviousness. The argument set forth above that there is no suggestion motivation to combine Gardner and Matsumoto to produce the claimed invention is incorporated here by reference. Tzannes provides no teaching or suggestion that would provide the suggestion to combine Gardner and Matsumoto. Therefore, the failure to provide a motivation or suggestion to combine the Gardner and Matsumoto references also applies to the

rejection of Claims 16 and 17. Accordingly, applicants respectfully requests withdrawal of the rejection and allowance of the claims.

### CONCLUSION

The Examiner has failed to establish a *prima facie* case of obviousness. In the various forms of rejections set forth by the Examiner there is a common theme, namely, an unsupported assertion that it would be obvious to use DMT modulation in a well-logging telemetry system or method because DMT modulation is used in the presence of cables. From there the Examiner has taken various limitations from DMT related references and erroneously concluded that because DMT modulation can be used in the presence of cables and cables are used in well-logging, it would be obvious to apply these various limitations in well-logging. However, that line of reasoning is not convincing. Accordingly, for that reason, and other reasons offered herein above, the Examiner has failed to establish a *prima facie* case of obviousness. “If examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of the patent.” In *re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992), *quoted in* *In re Lowry*, 32 F.3d 1579, 32 USPQ2d 1031 (Fed. Cir. 1994). Thus, for the reasons given above, Applicants respectfully request withdrawal of the rejection of Claims and their early allowance.

It is submitted that all the claims now in the application are allowable. Applicants respectfully request reconsideration of the application and claims and its early allowance. The Commissioner is hereby authorized to charge any fees associated with this response that may be required, or credit any overpayment, to Deposit Account 03-0330.

Respectfully submitted,



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